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A New Species of *Orthoprotella* (Crustacea: Amphipoda: Caprellidea) from Amakusa, Western Kyushu, Japan

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Abstract A new caprellid amphipod, *Orthoprotella spinigera*, is described and illustrated based on the specimens from Amakusa, western Kyushu, Japan. The new species, which is the second representative of the genus from Japan, differs from its congeners in the arrangement of projections of the body.

Key words: Amphipoda, Caprellidea, new species, *Orthoprotella*, Japan.

Introduction

Through the kindness of Dr. Masakazu Aoki, it has been possible for me to examine some specimens of a caprellid species collected during his ecological studies of the caprellids inhabiting a *Sargassum patens* bed at Amakusa, western Kyushu, Japan (see Aoki & Kikuchi, 1990). They were found on a rope tied to a buoy near the *Sargassum* bed (Aoki, personal communication). In its general appearance, the caprellid showed a close resemblance to *Metaprotella sandalensis* Mayer, 1898, which was known from Indo-Pacific region (McCain & Steinberg, 1970; Müller, 1990; Laubitz, 1991), and also recorded from central Japan (Utinomi, 1973; Mori, unpublished data). Detailed examination, however, revealed that it was a new species of the genus *Orthoprotella* Mayer, 1903. The description of the species is presented in this paper.

***Orthoprotella spinigera*, new species**
(Figs. 1-5)

Material examined. Holotype (SMBL Type No.389): male, 16 July 1988; paratypes (SMBL Type No. 390): 1 female, 16 July 1988; 3 males and 2 females, 5 August 1988; 3 m in depth, Tomioka, Amakusa Island (32°31'N, 130°02'E), Kumamoto Prefecture. The type series is deposited in the Seto Marine Biological Laboratory, Kyoto University.

Holotype male

Body (Figs. 1a-b) 8.85 mm long, slender. Head round, with pair of small dorsal projections directed anteriorly; eye large. Pereonite 1 fused with head, short, smooth. Pereonite 2 with pair of acute dorsal projections at the middle and single acute dorsal projection at the posterior end; each projection directed anteriorly. Pereonite 3 with acute dorsal projections in the same arrangement as in pereonite 2. Pereonite 4 with pair of small dorsal projections at the middle. Pereonite 5 with anterolateral bulge. Pereonites 6-7 short, smooth, distinct from each other but suture between them interrupted; pereonite 7 articulated with pereonite 6 obliquely, but these two pereonites coming in a straight line.

Antenna 1 (Fig. 1a) longer than body length; peduncular segment 1 short, moderately swollen; flagellum about 1/2 of peduncle in length. Antenna 2 (Fig. 1a) shorter than peduncle of antenna 1; antennal gland cone well-developed; swimming setae absent; flagellum 2-segmented.

Upper lip (Fig. 2a) symmetrically bilobed, pubescent apically. Lower lip (Fig. 2b): inner lobe well-developed, round, pubescent; outer lobe round apically, pubescent; mandibular

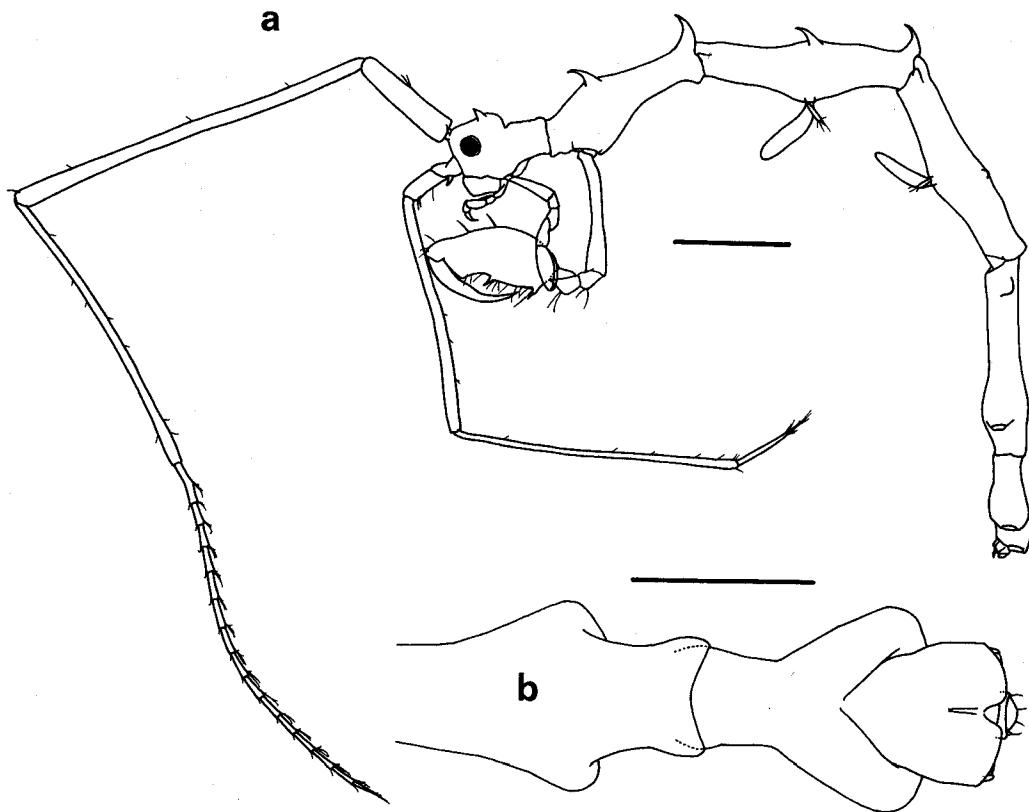


Fig. 1. *Orthoprotella spinigera*, new species, holotype male: a, lateral view; b, pereonites 5-7, dorsal view. Scales: a=1.0 mm; b=0.5 mm.

process developed.

Mandible (Figs. 2c-d): palp 3-segmented; segment 1 short; segment 2 with 3 medial and 1 apical setae; segment 3 falcate, pubescent on medial surface, with 1 long, 3 intermediate and 19-20 short, and 1 long setae from proximal to distal on medial margin. Left incisor and lacinia mobilis 5-toothed; setal row of 3 plumose setae. Right incisor 5-toothed; lacinia mobilis bilobed; setal row of 2 plumose setae. Left molar square; right molar oblong; molar flake (see Laubitz, 1993) on right molar missing in the holotype.

Maxilla 1 (Fig. 2e) without inner lobe; outer lobe rectangular, with 3 simple and 4 serrate spines on apical margin. Palp 2-segmented; distal segment with 4 spines on apical margin, 1 short seta on distal part of inner margin, and row of 4 setae on ventral surface.

Maxilla 2 (Fig. 2f): inner lobe smaller than outer lobe, trapezoid, pubescent on medial margin, with 8 marginal setae. Outer lobe rectangular, with 10 setae on apical margin.

Maxilliped (Fig. 2g): inner lobe small, about 1/3 as long as outer lobe in length, pubescent and irregularly serrate on apical margin, with 1 blunt spine, 1 simple and 2 plumose setae on apical margin, 1 plumose seta on dorsal surface. Outer lobe semicircular, large, exceeding midpoint of palpal segment 2, pubescent marginally; apical margin with 4 setae; medial margin almost straight, with 6 short setae. Palp 4-segmented; segments 1-3 with long setae on medial margins; segment 3 with triangular apical projection covered with numerous setulae on medial margin; segment 4 falcate, with rows of setulae on grasping margin.

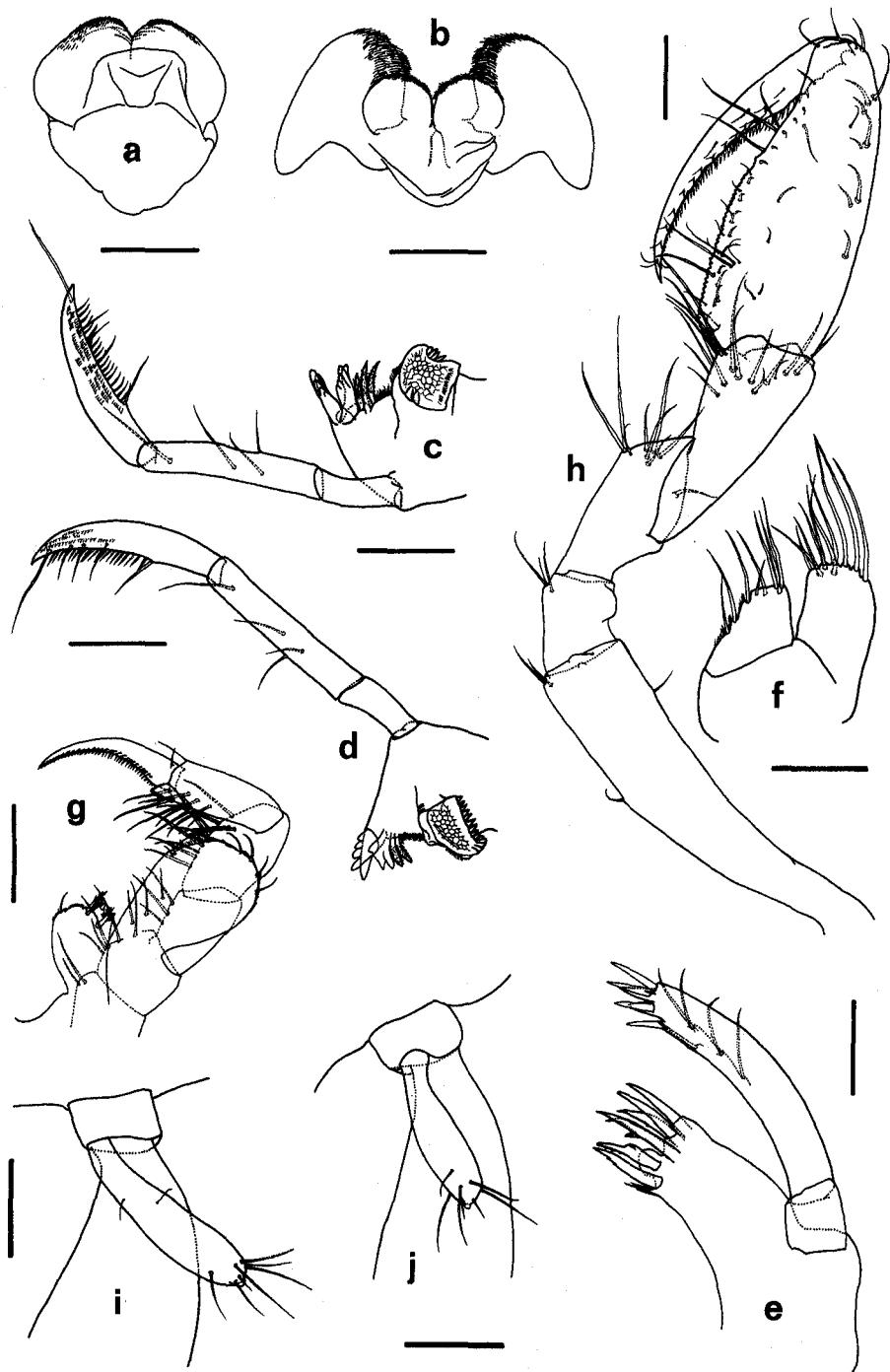


Fig. 2. *Orthoprotella spinigera*, new species, holotype male: a, upper lip; b, lower lip; c, left mandible; d, right mandible; e, maxilla 1; f, maxilla 2; g, maxilliped (left inner lobe, right outer lobe and palp); h, gnathopod 1; i, pereopod 3; j, pereopod 4. Scales: a-d = 0.1 mm; e-f = 0.05 mm.

Gnathopod 1 (Fig. 2h) slender. Ischium short. Merus and carpus with numerous long setae on distal surfaces. Propodus elongate; palmar corner with single grasping spine; grasping margin slightly convex, with numerous denticles and 2 rows of short setae. Dactylus slightly curved; grasping margin with 2 rows of numerous teeth.

Gnathopod 2 (Figs. 3a-b) attached to anterior part of pereonite 2. Basis shorter than pereonite 2; dorsodistal end slightly produced. Ischium, merus and carpus short. Propodus oval, subequal to basis in length, with numerous setae on dorsal and palmar surfaces; palmar corner moderately produced, with single grasping spine; proximal half of grasping margin with row of sockets of "pegs" (translucent short spines), almost all of which have dropped off in the holotype; submedial poison tooth and distal triangular projection present. Dactylus curved and narrowed distally; grasping margin with row of small teeth.

Gills (Fig. 1a) present on pereonites 3-4, small, elliptical.

Pereopods 3-4 (Figs. 2i-j) 1-segmented, about 1/3 of gills in length, slightly expanded, with single minute apical projection and 7 setae.

Pereopod 5 (Fig. 1a) missing, attached to posterior part of pereonite 5.

Pereopod 6 (Fig. 3c) attached to posterior end of pereonite 6, slender. Basis longest. Merus slightly expanded at the dorsodistal end. Propodus subequal to carpus in length; palmar corner with paired grasping spines; grasping margin with 2 rows of short setae. Dactylus slightly curved, with smooth grasping margin.

Pereopod 7 (Fig. 3d) morphologically similar to, but stouter than pereopod 6; propodus longer than carpus.

Abdomen (Figs. 4a-b) with pair of appendages, pair of lateral lobes, and single dorsal lobe. Abdominal appendage 2-segmented; apex of proximal segment round, with numerous setulae; distal segment slender, about 1/2 of proximal segment in length, with single apical seta. Lateral lobe with 1 medial seta. Dorsal lobe with pair of plumose and pair of simple setae. Penes large, medial.

Paratype female

Body (Fig. 5a) 5.90 mm long. Pereonite 3 without single dorsal projection at the posterior end; paired dorsal projections blunt.

Antenna 1 (Fig. 5a) slightly shorter than body length; flagellum subequal to peduncle in length. Antenna 2 (Fig. 5a) longer than peduncle of antenna 1.

Right mandible (Fig. 5b) with 4-toothed incisor and pubescent molar flake.

Maxilliped (Fig. 5c): outer lobe with 3 setae on apical margin, 8 short setae on medial margin.

Gnathopod 2 (Fig. 5d) morphologically similar to, but smaller than in male; palmar pegs remaining well on proximal half of grasping margin in the illustrated specimen.

Pereopod 5 (Fig. 5e) attached to posterior part of pereonite 5, morphologically similar to, but smaller than following pereopods; propodus subequal to carpus in length.

Abdomen (Fig. 4c) lacking appendages.

Etymology

From the Latin *spiniger*, spine-bearing, referring to the dorsal acute projections on the body.

Discussion

The generic assignment of the present new species is difficult, because it has diagnostic characteristics both of *Metaprotella* and of *Orthoprotella*. In its general appearance, the new species shows a close resemblance to the *Metaprotella* species, and the apical projection of the palpal segment 3 of the maxilliped has been considered to be a characteristic of the genus

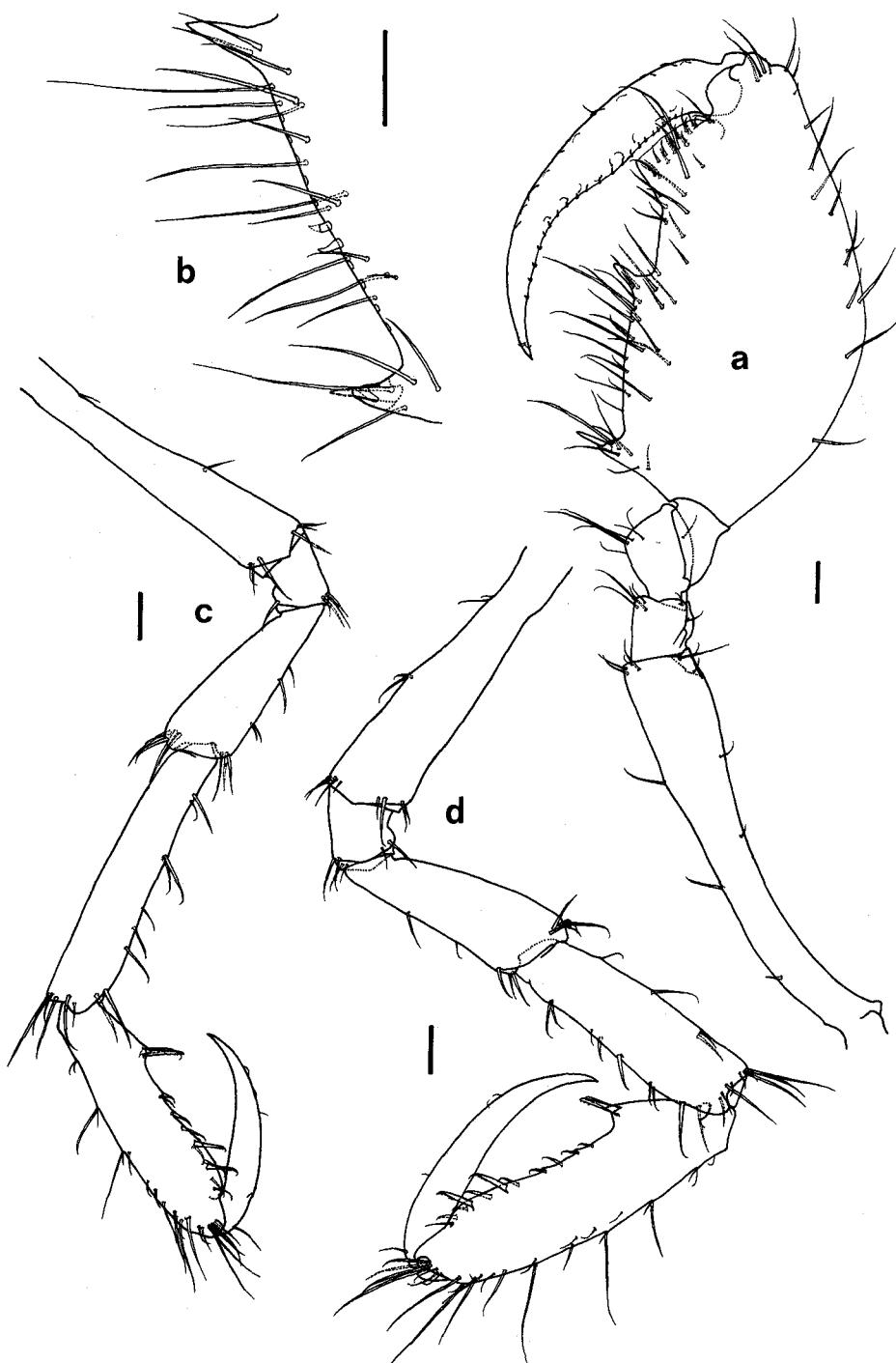


Fig. 3. *Orthoprotella spinigera*, new species, holotype male: a, gnathopod 2; b, palmar margin of gnathopod 2; c, pereopod 6; d, pereopod 7. Scales: 0.1 mm.

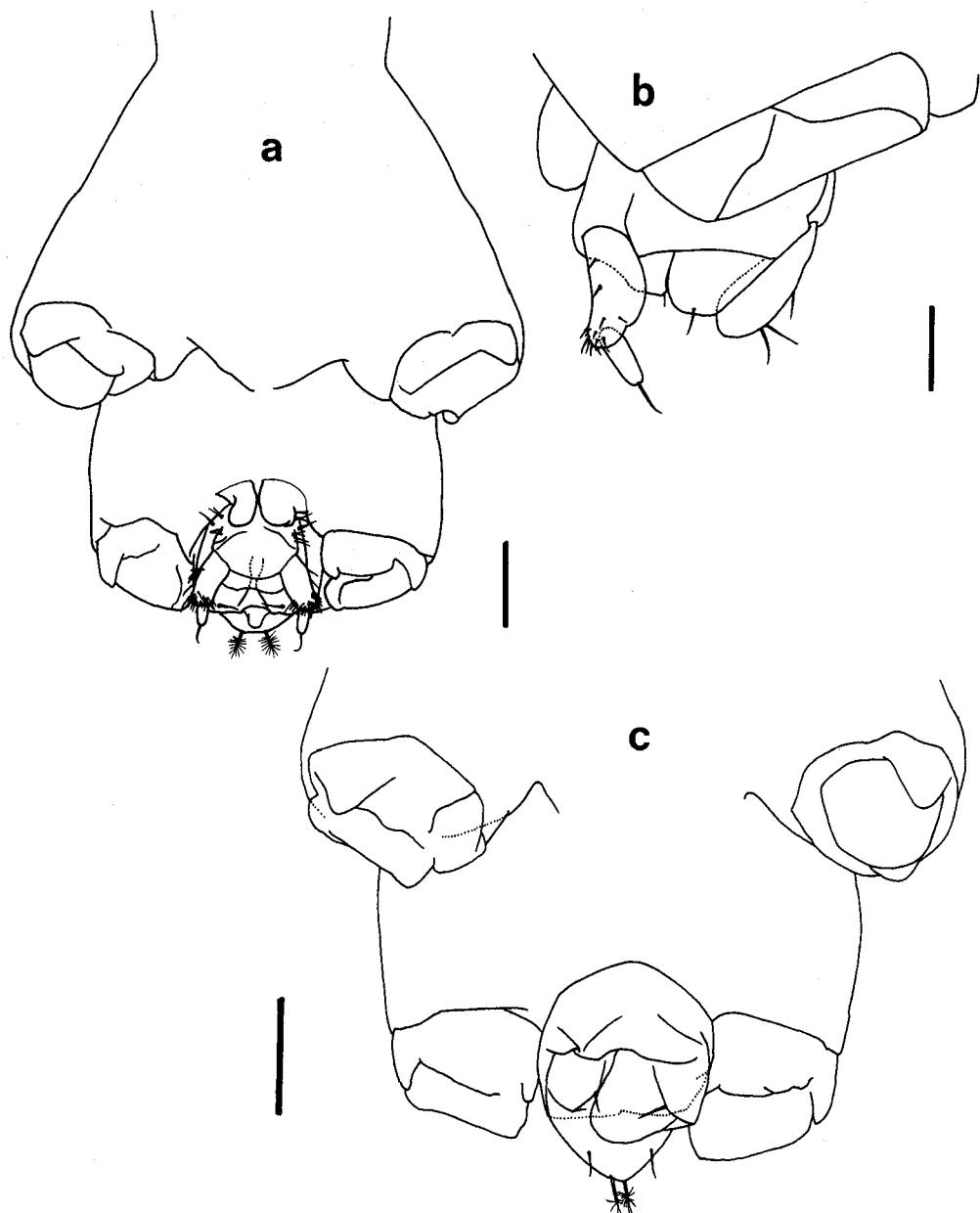


Fig. 4. *Orthoprotella spinigera*, new species, abdomen: a, holotype male, ventral view; b, holotype male, lateral view; c, paratype female, ventral view. Scales: a, c=0.1 mm; b=0.05 mm.

Metaprotella (Mayer, 1890, 1898; Laubitz, 1991). Consultation of the literature, however, shows that the apical projection of the palpal segment 3 of the maxilliped is also found in different genera such as *Paracaprella* and *Tritella* (e.g., McCain, 1968; Laubitz, 1970). The morphology of pereonites 6-7 places the present new species to the genus *Orthoprotella* (Mayer, 1903; Laubitz, 1991). Pereonites 6-7 of the new species come in a straight line, and are distinct from each other in spite of the interrupted suture between them. In the

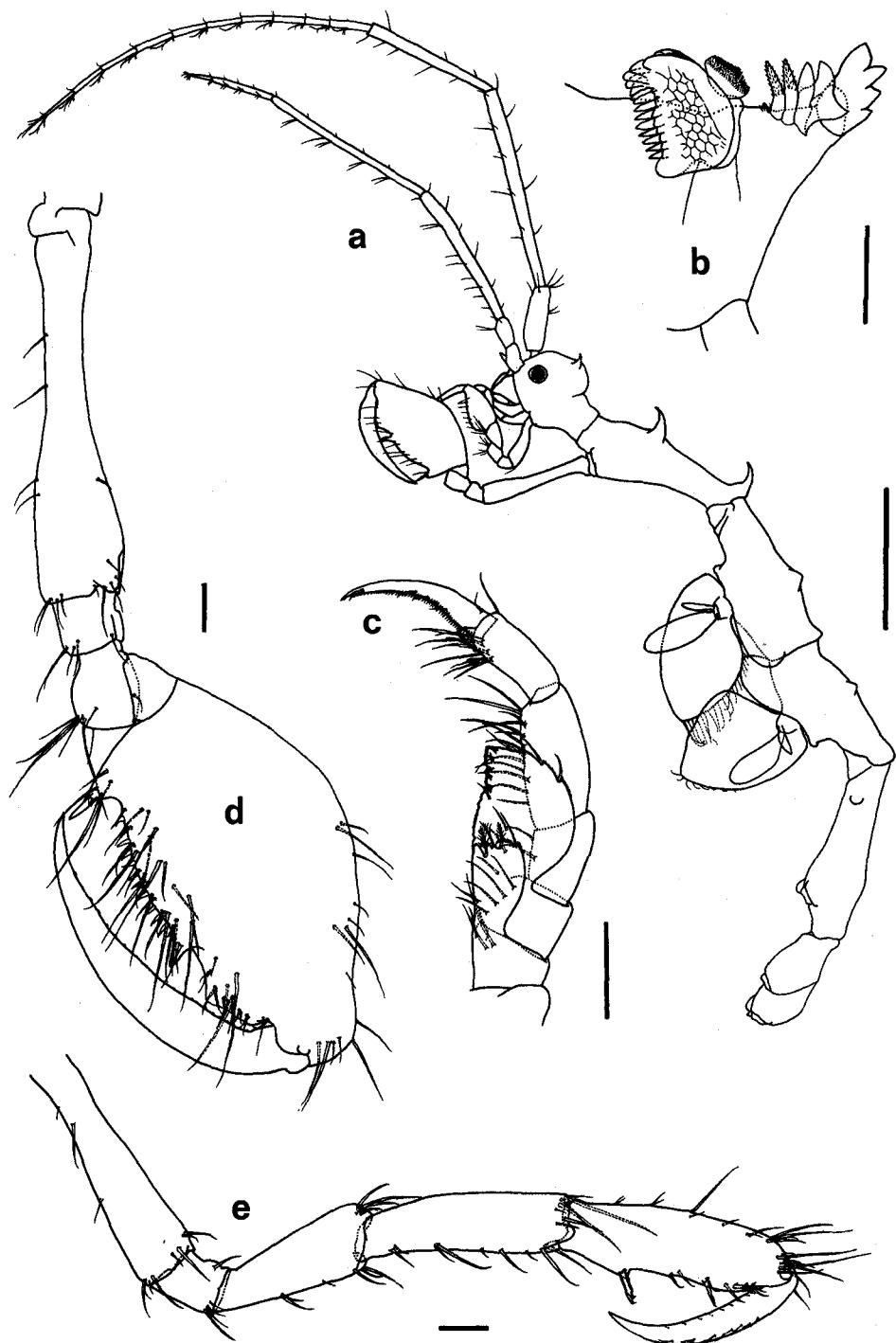


Fig. 5. *Orthoprotella spinigera*, new species, paratype female: a, lateral view; b, right mandible; c, maxilliped; d, gnathopod 2; e, pereopod 5. Scales: a=1.0 mm; b=0.05 mm; c-e=0.1 mm.

Metaprotella species, the pereonite 7 is located on the dorsal surface of the pereonite 6, and the two pereonites are united into one segment (e.g., Mayer, 1890, 1903; Sivaprakasam, 1977; Laubitz, 1991). The new species is tentatively assigned in the present paper to the genus *Orthoprotella*, based on the morphology of pereonites 6-7 which seems to be an important characteristic of *Orthoprotella*.

The genus *Orthoprotella* Mayer, 1903 was hitherto composed of 6 species: *O. australis* (Haswell, 1880) from southwestern Pacific; *O. mayeri* Barnard, 1916 from South Africa and southwestern Pacific; *O. gordoni* Guiler, 1954 from Tasmania; *O. tasmaniensis* Guiler, 1954 from Tasmania; *O. melloi* Quitete, 1975 from northern Brazil; *O. hamata* Arimoto, 1981 from Japan (McCain & Steinberg, 1970; Quitete, 1975; Arimoto, 1981; Laubitz, 1991). *Orthoprotella spinigera* is readily distinguished from all these congeners by the arrangement of dorsal projections of the body and by the shape of the male gnathopod 2.

In contrast, the arrangement of dorsal body projections of *Orthoprotella spinigera* is similar to that of three *Metaprotella* species: *M. excentrica* Mayer, 1890, *M. haswelliana* (Mayer, 1882), and *M. sandalensis* Mayer, 1898. *Orthoprotella spinigera* is most closely related to *Metaprotella sandalensis* among these three species, but it differs from *M. sandalensis* in the following features: male abdominal appendage distinctly 2-segmented (1-segmented in *M. sandalensis*); penes medial (penes lateral in *M. sandalensis*); pereopod 5 attached to posterior part, but never posterior end of pereonite 5 (pereopod 5 attached to posterior end of pereonite 5 in *M. sandalensis*); head and pereonite 2 without lateral projections (both head and pereonite 2 with acute lateral projections in *M. sandalensis*). By those differences, the new species is clearly distinguishable from *Metaprotella sandalensis*.

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